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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/747,731	12/22/2000	Shunpei Yamazaki	SEL 233	4617

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COOK, ALEX, McFARRON, MANZO
CUMMINGS & MEHLER, LTD.
Suite 2850
200 West Adams Street
Chicago, IL 60606

EXAMINER
FLETCHER III, WILLIAM P

ART UNIT	PAPER NUMBER
1762	4

DATE MAILED: 05/28/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/747,731	YAMAZAKI ET AL.	
	Examiner	Art Unit	
	William P. Fletcher III	1762	

-- Th MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____ .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) *1-18* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *19 and 20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on *22 December 2000* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

Detailed Office Action

I. Restriction Requirement

Restriction to one of the following inventions is required under 35 U.S.C. § 121:

i. Claims 1 - 18, drawn to a film formation apparatus, classified in class 118, subclass 727.

ii. Claims 19 & 20, drawn to a process of forming a thin film, classified in class 427, subclass 248.1.

The inventions are distinct, each from the other, because of the following reasons:

Inventions i and ii are related as a process and the apparatus for its practice. The inventions are distinct if it can be shown that either: (1) the process as claimed can be practiced by another, materially different apparatus or by hand, or (2) the apparatus as claimed can be used to practice another,

materially different process [MPEP § 806.05(e)]. In the instant case, either the apparatus as claimed can be used to practice etching, or the process as claimed can be practiced by hand.

Because these inventions are distinct for the reasons given above, and have acquired a separate status in the art as shown by their different classification, restriction for examination purposes as indicated is proper.

During a telephone conversation with Mark J. Murphy (Reg. No. 34,225) on 16 April 2002, a provisional election was made, without traverse, to prosecute the invention of group ii, claims 19 & 20. Affirmation of this election must be made by the applicants in replying to this Office action.

Claims 1 - 18 have been withdrawn from consideration by the examiner [37 C.F.R. § 1.142(b)], as being drawn to a non-elected invention.

The applicants are reminded that, upon the cancellation of claims drawn to a non-elected invention, the inventorship must be amended in compliance with 37 C.F.R. § 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 C.F.R. § 1.48(b) and by the fee required under 37 C.F.R. § 1.17(i).

II. Form & Content of Application

Title

The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

Drawings

This application has been filed with informal drawings which are acceptable for examination purposes only. Formal drawings will be required when the application is allowed.

The drawings are objected to. Please see the attached form PTO-948. A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

III. Rejections under 35 U.S.C. § 112, 2nd Paragraph

The following is a quotation of the second paragraph of 35 U.S.C. § 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

> **Claim 20** is rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which the applicants regard as the invention.

This claim recites "...wherein the substrate and a shadow mask composed of a metal are in a state of contact in accordance with an electromagnet." This limitation renders this claim indefinite for two reasons. First, it is unclear whether both the substrate and the shadow mask, or just the shadow mask, are intended to be made of metal. Second, it is unclear just what "...in a state of contact in accordance with an electromagnet..." means. Does this mean that the mask is secured to the substrate by some means and an electromagnet is present, or that the electromagnet is somehow involved in the securing of the mask?

For the purpose of examining the claims on their merits, the examiner has interpreted this limitation in light of p. 9, ll. 1 - 7 of the specification, in which, under the influence of the electromagnet, the mask is drawn to the substrate.

IV. Rejections under 35 U.S.C. § 103

The following is a quotation of 35 U.S.C. § 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

> **Claim 19** is rejected under 35 U.S.C. § 103(a) as being unpatentable over Takacs et al. {US 6,244,212 B1} in view of Grothe et al. {US 3,931,490}.

Takacs et al. teach a process of forming a thin film on a substrate. The applicants' attention is drawn to Fig. 1. The stage 40, houses the deposition source 42. During deposition of a film, the stage is moved back-and-forth along rail 36 in the direction illustrated by the double-headed arrow (essentially to-and-from the viewer). The source 42 is "an electron beam evaporator consistent with those well known in the art" [c. 4, ll. 13 - 14]. Such evaporators typically include a crucible or boat which contains the material or materials to be evaporated, and an electron beam source or sources [c. 1, ll. 15 - 44 and c.

4, ll. 15 - 30]. Takacs et al. are silent with respect to the shape and orientation of the crucible or boat, but place no limitations or restrictions on these parameters either.

Takacs et al. do not teach that the evaporation source is moved in a direction perpendicular to its longitudinal direction.

Grothe et al. teach a process of coating a substrate by vapor deposition in general, utilizing an electron beam evaporation source in particular. They teach that, when coating wide substrates, a boat or crucible elongated in one dimension results in enhanced vapor density and deposition uniformity over the entire width of the substrate [c. 5, ll. 40 - 50 and 60 - 63].

Summarizing, Takacs et al. teach that electron beam evaporators consistent with those known in the art may be used in the practice of their invention. Grothe et al. teach that, when it is desired to coat a wide substrate by vapor deposition in general, utilizing an e-beam evaporation source in particular, superior results are obtained with a crucible elongated in one dimension. It would have been obvious to one of ordinary skill in the art, at the time the invention was made, to modify the process of Takacs et al. so as to utilize, in the e-beam source, a crucible elongated in one dimension.

One of ordinary skill in the art would have been motivated to do so by the expectation of yielding a film on the wide substrate 70 of Takacs et al. with enhanced deposition uniformity, as discussed above.

It would have been further obvious to one of ordinary skill in the art to orient the crucible in the e-beam evaporation source in such a fashion that the elongated dimension be perpendicular to the motion along the rail. One of ordinary skill in the art would have been motivated to do so by the expectation of improving the overall coating process efficiency by coating the widest swath of substrate possible with each pass of the coating source.

> **Claim 19** is rejected under 35 U.S.C. § 103(a) as being unpatentable over Bennett {US 2,435,997}, in view of Grothe et al. {US 3,391,490}, in further view of Barshter {US 4,446,357}.

Bennett teaches a process for vapor coating large surfaces. The applicants' attention is drawn to Fig. 2. The evaporation source, comprising crucible 13, is moved back-and-forth beneath substrate 5 in the pattern described by guideway 7. The crucible is resistance-heated [c. 3, ll. 1 - 10].

Bennett does not teach that the evaporation source is moved in a direction perpendicular to its longitudinal direction.

As described above, Grothe et al. teach that, in vacuum deposition processes for coating wide substrates, enhanced deposition uniformity is obtained with a crucible elongated in one dimension.

Furthermore, Barshter teaches that elongated resistance-heated crucibles are known as evaporation sources in vacuum vapor deposition processes [c. 1, ll. 1 - 30].

Therefore, it would have been obvious to one of ordinary skill in the art, at the time the invention was made, to modify the process of Bennett so as to utilize, as the resistance-heated crucible, a crucible elongated in one dimension. One of ordinary skill in the art would have been motivated to do so by the expectation of yielding a film on the wide substrate 5 of Bennett with enhanced deposition uniformity, as discussed above.

It would have been further obvious to one of ordinary skill in the art to orient the crucible in such a fashion that the elongated dimension be perpendicular to the motion along the rail. One of ordinary skill in the art would have been motivated to do so by the expectation of improving the overall coating process efficiency by coating the widest swath of substrate possible with each pass of the coating source.

> **Claim 20** is rejected under 35 U.S.C. § 103(a) as being unpatentable over Mizutani et al. {US 6,326,726 B1}, in view of Takacs et al. {US 6,244,212 B1}, in further view of Grothe et al. {US 3,931,490}, and in still further view of Namiki et al. {US 5,429,884}.

Mizutani et al. teach a process for the manufacture of an electroluminescent device in which the cathode is applied by vacuum vapor depositing the cathode material through a shadow mask c. 5, ll. 52 - 56]. The mask is held in place against the substrate by an electromagnet [c. 5, ll. 52 - 57; c. 5, l. 65 - c. 6, l. 6]. The substrate is glass [c. 7, l. 25]. The cathode material is a metal [c. 7, l. 55]. Mizutani et al. are silent with respect to the type of vacuum vapor deposition assembly that may be employed to carry out their invention.

Takacs et al. teach the vacuum vapor deposition assembly described above. Takacs et al. are silent with respect to those vacuum vapor deposition process that may be carried-out in their assembly. Therefore, it would have been obvious to one of ordinary skill in the art, at the time the invention was made, to modify the process of Mizutani et al. so as to utilize the vacuum vapor deposition assembly taught by Takacs et al. to

deposit at least the cathode layer. One of ordinary skill in the art would have been motivated to do so by the expectation of successfully depositing at least the cathode layer by vacuum vapor deposition.

The examiner notes that the process of Mizutani et al. utilizes a resistance-heated source to vaporize the deposition material, while Takacs et al. utilize an e-beam source to vaporize the deposition material. It is the examiner's position that both resistance and e-beam vaporization sources are well-known in the art for the vaporization of deposition materials, and that the changes in process parameters attendant to utilizing one source or the other would have been well-within the level of skill of one of ordinary skill in the art at the time the invention was made.

As noted above, Takacs et al. do not teach that the evaporation source is moved in a direction perpendicular to its longitudinal direction.

Grothe et al. teach a process of coating a substrate by vapor deposition in general, utilizing an electron beam evaporation source in particular. They teach that when coating wide substrates, a boat or crucible elongated in one dimension results in enhanced vapor density and deposition uniformity over

the entire width of the substrate [c. 5, ll. 40 - 50 and 60 - 63].

Summarizing, Takacs et al. teach that electron beam evaporators consistent with those known in the art may be used in the practice of their invention. Grothe et al. teach that when it is desired to coat a wide substrate by vapor deposition in general, utilizing an e-beam evaporation source in particular, superior results are obtained with a crucible elongated in one dimension.

It would have been obvious to one of ordinary skill in the art, at the time the invention was made, to modify the process of Mizutani et al. in view of Takacs et al. so as to utilize, in the e-beam source, a crucible elongated in one dimension. One of ordinary skill in the art would have been motivated to do so by the expectation of yielding a film on the wide substrate 70 of Takacs et al. with enhanced deposition uniformity, as discussed above.

It would have been further obvious to one of ordinary skill in the art to orient the crucible in the e-beam evaporation source in such a fashion that the elongated dimension be perpendicular to the motion along the rail. One of ordinary skill in the art would have been motivated to do so by the expectation of improving the overall coating process efficiency

by coating the widest swath of substrate possible with each pass of the coating source.

The examiner notes that Mizutani et al. particularly suggest that the cathode is an alloy of two metals in a specific ratio, each deposited from their own, individual evaporators [c. 9, ll. 44 - 48]. Namiki et al. teach a similar process in which the cathode is also an alloy of two metals in a specific ratio [c. 5, ll. 40 - 45]. Namiki et al. teach that better process control is achieved if a pre-formed alloy matrix, comprising the metals in their desired ratios, is evaporated from a single crucible [c. 5, ll. 60 - 65]. While Namiki et al. particularly suggest an Al-Li alloy, it is clear that their evaporation process may advantageously be applied to other alloys, including the Mg-Ag alloy with Mg:Ag = 10:1 taught by Mizutani et al., with a reasonable expectation of success. Therefore, it would have been obvious to one of ordinary skill in the art, at the time the invention was made, to modify the process of Mizutani et al., in view of Takacs et al., in further view of Grothe et al. so as to evaporate the cathode material as a pre-formed alloy from a single crucible, as suggested by Namiki et al. One of ordinary skill in the art would have been motivated to do so by the expectation of achieving better control over the evaporation process, as taught by Namiki et al.

> **Claim 20** is rejected under 35 U.S.C. § 103(a) as being unpatentable over Mizutani et al. {US 6,326,726 B1}, in view of Bennett {US 2,435,997}, in view of Grothe et al. {US 3,931,490}, in further view of Barshter {US 4,446,357}, in still further view of Namiki et al. {US 5,429,884}.

Mizutani et al. teach a process for the manufacture of an electroluminescent device in which the cathode is applied by vacuum vapor depositing the cathode material through a shadow mask c. 5, ll. 52 - 56]. The mask is held in place against the substrate by an electromagnet [c. 5, ll. 52 - 57; c. 5, l. 65 - c. 6, l. 6]. The substrate is glass [c. 7, l. 25]. The cathode material is a metal [c. 7, l. 55]. Mizutani et al. are silent with respect to the type of vacuum vapor deposition assembly that may be employed to carry out their invention.

Bennett teaches the vacuum vapor deposition assembly described above. Bennett is silent with respect to those vacuum vapor deposition process that may be carried-out in their assembly. Therefore, it would have been obvious to one of ordinary skill in the art, at the time the invention was made, to modify the process of Mizutani et al. so as to utilize the vacuum vapor deposition assembly taught by Bennett to deposit at

least the cathode layer. One of ordinary skill in the art would have been motivated to do so by the expectation of successfully depositing at least the cathode layer.

As noted above, Bennett does not teach that the evaporation source is moved in a direction perpendicular to its longitudinal direction.

Also as described above, Grothe et al. teach that, in vacuum deposition processes for coating wide substrates, superior results are obtained with a crucible elongated in one dimension.

Furthermore, Barshter teaches that elongated resistance-heated crucibles are known as evaporation sources in vacuum vapor deposition processes.

Therefore, it would have been obvious to one of ordinary skill in the art, at the time the invention was made, to modify the process of Bennett so as to utilize, as the resistance-heated crucible, a crucible elongated in one dimension. One of ordinary skill in the art would have been motivated to do so by the expectation of yielding a film on the wide substrate 5 of Bennett with the properties discussed above.

It would have been further obvious to one of ordinary skill in the art to orient the crucible in such a fashion that the elongated dimension be perpendicular to the motion along the

rail. One of ordinary skill in the art would have been motivated to do so by the expectation of improving the overall coating process efficiency by coating the widest swath of substrate possible with each pass of the coating source.

The examiner notes that Mizutani et al. particularly suggest that the cathode is an alloy of two metals in a specific ratio, each deposited from their own, individual evaporators [c. 9, ll. 44 - 48]. Namiki et al. teach a similar process in which the cathode is also an alloy of two metals in a specific ratio [c. 5, ll. 40 - 45]. Namiki et al. teach that better process control is achieved if a pre-formed alloy matrix, comprising the metals in their desired ratios, is evaporated from a single crucible [c. 5, ll. 60 - 65]. While Namiki et al. particularly suggest an Al-Li alloy, it is clear that their evaporation process may advantageously be applied to other alloys, including the Mg-Ag alloy with Mg:Ag = 10:1 taught by Mizutani et al., with a reasonable expectation of success. Therefore, it would have been obvious to one of ordinary skill in the art, at the time the invention was made, to modify the process of Mizutani et al., in view of Bennett, in view of Grothe et al., in further view of Barshter, so as to evaporate the cathode material as a pre-formed alloy from a single crucible, as suggested by Namiki et al. One of ordinary skill in the art would have been

motivated to do so by the expectation of achieving better control over the evaporation process as taught by Namiki et al.

V. Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to William P. Fletcher III whose telephone number is (703) 308-7956. The examiner can normally be reached on Monday through Thursday, 7 AM to 5 PM, Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Shrive P. Beck can be reached on (703) 308-2333. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

William Phillip Fletcher III
Patent Examiner
United States Patent & Trademark Office
Group Art Unit 1762

wpf
May 22, 2002

SHRIVE P. BECK
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1700